

PRICE
15¢

JUL 13 1937

SCIENCE NEWS LETTER

DICAL ROOM
AT URBAN
OF MICH

THE WEEKLY SUMMARY OF CURRENT SCIENCE



July 10, 1937

"But Few Are Chosen"

See Page 21

A SCIENCE SERVICE PUBLICATION

SCIENCE NEWS LETTER

Vol. XXXII



No. 845

The Weekly Summary of

Current Science

Published Every Saturday by
SCIENCE SERVICE
 2101 Constitution Avenue
 Washington, D. C.

THE INSTITUTION FOR THE POPULARIZATION OF SCIENCE organized 1921 as a non-profit corporation, with trustees nominated by the National Academy of Sciences, the National Research Council, the American Association for the Advancement of Science, the E. W. Scripps Estate and the journalistic profession.

Edited by WATSON DAVIS

Subscription rates—\$5.00 a year postpaid; two years \$7.00; 15 cents a copy. Ten or more copies to same address, 5 cents a copy. Back numbers more than six months old 25 cents.

Canadian subscribers please add 50 cents a year, foreign subscribers 75 cents a year to regular subscription rate to cover postage.

Members of the American Association for the Advancement of Science have the privilege of subscribing to SCIENCE NEWS LETTER at the reduced price of \$3 per year. Application for this privilege should be accompanied by privilege card obtained from the Permanent Secretary, A.A.A.S., Smithsonian Institution Building, Washington, D. C.

In requesting change of address, please give your old address as well as the new one in notification to Circulation Department, SCIENCE NEWS LETTER, 2101 Constitution Ave., Washington, D. C., at least two weeks before change is to become effective.

Copyright, 1937, by Science Service, Inc. Reproduction of any portion of the SCIENCE NEWS LETTER is strictly prohibited. Newspapers, magazines and other publications are invited to avail themselves of the numerous syndicate services issued by Science Service.

Cable address: Scienserv, Washington.

Entered as second class matter at the post-office at Washington, D. C., under the act of March 3, 1879. Established in mimeographed form March 13, 1922. Title registered as trademark, U. S. and Canadian Patent Offices.

Advertising rates furnished on application. Member Audit Bureau of Circulations.

Board of Trustees of Science Service

Honorary President, William E. Ritter, University of California; Honorary Vice-President, Vernon Kellogg, National Research Council. Representing the American Association for the Advancement of Science, J. McKeen Cattell, Editor, Science, Garrison, N. Y.; Henry B. Ward, University of Illinois, Urbana, Ill.; Edwin G. Conklin, President, American Philosophical Society, Philadelphia, Pa. Representing the National Academy of sciences, W. H. Howell, Vice-President and Chairman of Executive Committee, Johns Hopkins University, Baltimore, Md.; R. A. Millikan, Director, Norman Bridge Laboratory of Physics, California Institute of Technology, Pasadena, Calif.; Harlow Shapley, Director, Harvard College Observatory, Cambridge, Mass. Representing National Research Council, Ludvig Hektoen, John McCormick Institute for Infectious Diseases, Chicago, Ill.; C. G. Abbot, Secretary, Smithsonian Institution, Washington, D. C.; Harrison E. Howe, Editor of Industrial and Engineering Chemistry, Washington, D. C. Representing Journalistic Profession, John H. Finley, Editor, New York Times; Mark Sullivan, Writer, Washington, D. C.; Dean Carl W. Ackerman, Columbia University Graduate School of Journalism, New York City. Representing E. W. Scripps Estate, Harry L. Smithson, Treasurer, Cincinnati, Ohio; Robert P. Scripps, Scripps-Howard Newspapers, West Chester, Ohio; Warren S. Thompson, Miami University, Oxford, Ohio.

Staff of Science Service

Director, Watson Davis; Staff Writers: Frank Thone, Emily C. Davis, Jane Stafford, Marjorie Van de Water, Robert Potter; Astronomy writer, James Stokley. Correspondents in principal cities and centers of research. Librarian, Minna Gill; Sales and Advertising Manager, Hallie Jenkins.

DO YOU KNOW?

Jellyfish look unappetizing, but they are eaten by codfish and whales.

Germ of typhoid fever have been found in centers of some gall stones.

A full-grown grizzly bear stands about eight feet high when he rears on his hind legs.

Over a million people in the United States suffer from stuttering speech, according to one estimate.

An expert on refrigeration has said that 77 per cent. of the world's food supply is highly perishable.

Relative to their height, short people have larger heads and brains than tall people, a British scientist finds.

There are 15 million dogs in the United States, according to an estimate, and over two million are pedigreed animals.

Fishermen can talk as much as they like, so far as fish are concerned—fish cannot hear and are affected only by sounds that cause vibrations in the water.

By optical instruments it is possible to discover whether steel contains as little as one part in 100,000 of chromium, which would affect the magnetic properties of the steel.

A remotely controlled outside program in television was recently broadcast from London's ultra-short wave station.

Tartaric acid, used in baking powder and medicines, is being produced from leaves and sprouts of grapevines in Russia.

Zoo animals dine at intervals ranging from five minutes to two weeks, says William Bridges of the New York Zoological Park.

A new smoke ejector for use in fire-fighting consists of a gasoline engine which runs a fan, which in turn sucks smoke rapidly out through a pipe.

Seeking a substitute for flower nectar, one zoological park feeds humming birds a mixture of condensed milk, honey, and a baby food preparation.

Death of a farm child caused by an electric fence, and another child's narrow escape, has aroused Cornell University to warn farmers against home-made electric fences.

Removing the green film of copper salts from old brass articles may make them look less "antique," but a museum official points out that when such relics are exhibited the object is usually to show them as they looked when in daily use.

WITH THE SCIENCES THIS WEEK

Most articles are based on communications to Science Service or papers before meetings, but where published sources are used they are referred to in the article.

ARCHAEOLOGY

How long ago was boxing enjoyed? p. 19.

Where are animal traps of the Stone-Age type in use today? p. 25.

ASTRONOMY

What heavenly body besides the sun is expected to break out in spots? p. 21.

BIOLOGY

What is the difference between life and death? p. 19.

EMBRYOLOGY

At what age does young life become liable to death's attack? p. 21.

ENGINEERING

Why should a smoking room be small? p. 25.

ENTOMOLOGY

How do men battle against the grasshopper when it is in the crawling stage? p. 20.

GENERAL SCIENCE

What metal serves as a tonic for sick plants? p. 22.

Why is life as we know it not widely distributed in the solar system? p. 22.

GEOGRAPHY

Is there an ice-free port above the Arctic circle? p. 26.

HYGIENE

At what time of day should mint juleps be served in summertime? p. 20.

Why should ants be kept out of the camp sugar? p. 24.

MEDICINE

Is the effectiveness of prontosil confined to streptococci infections? p. 24.

PHYSICS

How do scientists measure the thickness of films only 86 billionths of a centimeter through? p. 25.

PSYCHOLOGY

What prevents chimpanzees from learning to talk? p. 23.

BIOLOGY

Life is a Growing Crystal Pattern; In Death It Sets

Progress in Field of Physical Sciences Following X-Ray Photography of Crystals Extends to Biology

DEATH is a crystalline pattern permanently set. Life is associated with the formation and destruction of crystals. The living organism is crystalline in nature, just like the material of the non-living world. Evolution began with the joining of basic elements to form very simple compounds long before life was born on earth.

These new ideas of life, death and evolution were presented to the American Association for the Advancement of Science at its Denver meeting, by Dr. George A. Baitsell, Yale biologist, as the result of recent X-ray studies which reveal the crystalline structure of living matter.

Since Alue of Switzerland demonstrated in 1912 that X-ray photographs can determine with great precision how molecules are arranged to form metal and other crystals, there have been vast practical and theoretical strides in metallurgy, chemistry and physics because of the new facts obtained.

Evidently biology now stands on the threshold of a similar development. For workers in this field have found a crystalline structure in all sorts of organic substances which are the building materials of life. First it was proved that cotton's cellulose, silk's and wool's protein and the stuff of other plant and animal fibers consist of strings of molecules joined to form minute crystals. And then everywhere the X-ray was turned, upon the fibers of our connective tissues known as collagen, upon fibrin of clotted blood, the basic crystalline pattern was revealed. Even the jelly-like protoplasm of muscle and nerve cells is fundamentally crystalline and striations in muscles are caused by a definite crystal structure within them.

Form and Reform

The very processes of life, according to Dr. Baitsell, are associated with the breaking down and the reforming of cellular structure, crystalline in nature. When the living cell loses this ability to form and reform the crystals, it is dead. Look into the chromosomes, those bear-

ers of heredity that pass life on from one generation to another, and there also crystals will be found at the very citadel of our germ cells.

Just as the chemist knows that the invisible molecule made up of atoms is the smallest possible unit of any non-living substance, so Dr. Baitsell views the cell of the biologist as the analogous indivisible unit of life. Like the inorganic molecule it is essentially crystalline in nature.

"Each cell is a living crystal, a complete functional unit of life with a precise pattern characteristic of its particular tissue and species," Dr. Baitsell explained.

Out of this uniformity of living units comes the opportunity for that progress in the living world known as evolution, that process that gave rise to new kinds of plants and animals. Just as the chemist can skillfully insert a new atom into a molecule and change its nature,

so nature remodels its cells and lo, a permanent change or mutation takes place, giving a modified animal or plant.

If this is the mechanism of evolution, as Dr. Baitsell believes, then it could have begun long before there were any living organisms. Evolution began when water was first formed out of hydrogen and oxygen, when carbon and oxygen formed carbon dioxide, when these two products formed sugar and when sugar joined with other elements to form complex proteins, necessary for building living substances.

Dr. Baitsell drew a striking analogy between the states of matter and the way living things are organized. In a gas the molecules are all free and independent, flying around as they desire. Likewise microscopic one-celled living organisms are independent and live their own free lives. In a solid the molecules are firmly fixed in a crystalline pattern, regimented completely. So also the cells in the higher organisms, including man, have lost all independence and cannot live apart from the organized whole.

Thus to Dr. Baitsell the evidence today points conclusively to a principle of uniformity in all nature, which has hitherto been lacking. The biologist has regarded the world of life as being unique in its structural characteristics, but the X-ray shows crystals in everything and basic uniformity everywhere.

Science News Letter, July 10, 1937



ANCIENT SPORTS

Civilizations of 5,000 years ago had their sports, too, as new discoveries by Dr. E. A. Speiser, director of the joint expedition of the University Museum of the University of Pennsylvania and American Schools of Oriental Research have disclosed. The life-like pose on the left shows in stone relief two boxers that differ little from the champions of modern days. At right is a bronze figurine of two wrestlers posed in what later became known as Greco-Roman style of wrestling. The little cup on their heads added utility to the tiny art work. The finds were made at Khafaje, near Baghdad.

ENTOMOLOGY

Grasshopper Hordes Are Marching Through Colorado

Insect Army Now in Crawling Stage Moving At Rate Of Two and Half Miles in Eight Hour Period

By **WATSON DAVIS**

Director of Science Service, Writing From Hugo, Colorado.

INVADING millions are on the march, carrying a threat to the crops of eastern Colorado and western Kansas. I have seen them trekking across the plains near here, almost as if the earth itself in this dustbowl region were moving.

The predicted plague of grasshoppers has arrived. Ranchers and farmers of this region are joining state and federal officials in poison warfare against them.

The grasshopper of the plague hereabouts is a little fellow. This long-winged grasshopper of the Plains, entomologically known as *Dissostertia longipennis* Thomas, is now only a half to three-quarters of an inch long. He is dust-gray in color, and when he jumps nimbly out of your way he shows yellow, green and brown splotches and a cream-yellowish belly.

His personal lack of size is made up for by numbers in the grasshopper army. Dozens and scores are found in a square foot, which means millions per acre in the thicker, larger hordes.

At the Denver science meetings I heard of the grasshopper invasion growing more serious hour by hour. Here at Hugo I joined an anti-grasshopper war council led by Colorado's agriculture extension director, F. A. Anderson. With him and the Lincoln County agent, D. L. McMillen, I saw the monotonous, persistent advance of the hoppers across yellow- and red-flowered cactus-studded ranges from which the wind constantly whipped up fine dust that gritted one's teeth hours afterward. I charged through the millions of hoppers with an automobile that killed hundreds with each turn of a tire. Heavily traveled Route 40 near here is swarming for a distance of five miles with grasshoppers hurrying to more food.

It is a swift and earnest march for these migrating hoppers just now. They put one foot in front of another like a mouse or a man, and jump only when

they are frightened and really must.

The aviation phase of their advance is still to come, due not long after the beginning of July. When they do fly they will travel much faster and be more dangerous.

At present they are moving a matter of miles per day. One curious person here painted some of the hoppers with luminous paint and found that that particular army traveled two and one-half miles in an eight-hour period.

Just where these migratory hoppers came from this year the insect experts could not tell me. The batch I observed was headed north, and that may mean that they were hatched farther south in Colorado.

The only way to attack the hoppers

HYGIENE

Avoid Heat Strokes By Adopting Army Methods

A LESSON on avoiding heat-stroke may be taken from a report of the Inspector General of the Italian Army and Navy medical services during the Italo-Ethiopian War. This eminent scientist, Sir Aldo Castellani, was responsible for the health of the Italian fighting forces during that war waged by white men in a tropical country.

Heat-stroke was expected to play havoc with the troops. During the World War, in the Expeditionary Force in Mesopotamia in 1917 there were 6,242 cases with 524 deaths. Heat-stroke was almost completely absent among the Italian troops both in Eritrea and Somaliland, Sir Aldo reported. There was a total of 30 cases with 7 deaths.

Sir Aldo attributed this remarkable record to three precautions: 1. The use of the sun-helmet by every soldier; 2. No alcoholic drinks, not even a glass of wine, except after sunset; 3. Whenever possible marching was avoided and the

now is to offer them poisoned food. I saw great troughs of old sawdust, bran, and deadly sodium arsenite being mixed. This bait is spread in the fields in the path of the advancing hoppers. S. C. McCampbell, Colorado's extension entomologist, designed a mechanical spreader for this bait, with which three men can distribute as much as 25 men with shovels.

In this respect there is a shortage of material and men, despite the wholehearted aid with trucks and men of the U. S. Soil Conservation Service forces. Dr. H. H. Bennett, its chief, motored through here and pledged continued aid to agents and commissioners of nine Colorado counties assembled.

Dr. E. D. Ball, Arizona state entomologist, told the scientists at Denver that grasshoppers normally get a quarter of the grass on the ranges that stock should be eating. They will get much more than that this year.

And unless the anti-hopper forces get prompt and generous support—poison spread now is much more effective than attempts at control later—we human beings will lose some of the food that we need for our dinner tables.

Science News Letter, July 10, 1937

troops were transported in motor lorries.

Application to civilians of the principles behind these protective measures is fairly obvious. Sun-helmets are probably not necessary outside of the tropics, but the idea is to keep the head protected from the sun by a light hat that has an air-space between the top of the hat and the top of the head.

Sundown is the hour for serving mint juleps or any other alcoholic drinks during hot weather. Incidentally, the Italian troops did not get mint juleps even then, but the much lighter beverage, wine. Stronger drink was limited to brandy once a week. The amount was one ounce, and less than that in the lower and presumably hotter regions of Eritrea and Somalia.

The third preventive measure, avoidance of marching, translates for civilian life into the precaution of avoiding strenuous physical activity as much as possible.

Science News Letter, July 10, 1937

EMBRYOLOGY

Eggs of Opossum Photographed To Show Earliest Life Stages

Natural Selection Shown at Work, Eliminating "Unfit" at Fertilization and During Early Growth

See Front Cover

EGGs of a very primitive type of mammal, the common American opossum, have been studied and photographed by Dr. Carl Hartman and his associates of the Department of Embryology, Carnegie Institution of Washington, in their Baltimore laboratory. They have succeeded in obtaining these early life stages at several points of development, from unfertilized and just-fertilized eggs to the earliest divisions of the body into the beginnings of nervous system, muscles, etc.

It takes trained eyes and critical searching to find the eggs in their first, unfertilized state. They are then only about the size of poppy or tobacco seed, and of just about the same color as the much-wrinkled walls of the uterus, or reproductive cavity, into which they have been discharged from the ovaries. Yet careful hunting succeeds in locating them, and equally careful gathering methods get them out.

Architectural Outline

Immediately after fertilization by the spermatozoa, the eggs enlarge rapidly to several times their original diameter, and become somewhat clearer in appearance. They are then said to be in the primary vesicle stage.

On the surface of the vesicle appears a scarcely visible white line or streak. It is caused by a thickening or condensation of the living, actively growing protoplasm, and is known as the primitive streak. It is a sort of architectural chalk-line, showing where future building is to take place, for it marks the site where the new animal's body will begin to develop.

One of the most interesting of Dr. Hartman's photographs shows a group of 22 cells at this early stage of development. Seven of them have been fertilized and have grown normally; four, though fertilized, show dwarfed or retarded growth; eleven remain unfertilized and show no growth or development at all.

Dr. Hartman cites this as a case of

natural selection at work even before birth. The eleven unfertilized eggs apparently lack some necessary factor of vitality from their very formation. They are the wholly unfit, and will come to nothing. They are life-seeds that fall by the wayside.

The four eggs that are fertilized but fail to grow normally represent genetic stock that "has something"—but not enough. It is doubtful whether they will develop into young animals at all; more likely they, too, will die before birth and their substance be resorbed into the parent's body.

The seven that have been normally fertilized and have grown to full size stand a good chance of coming to birth as young opossums. Seven would not be an extraordinary litter for an opossum. But even part of these may not come through. Thus death lies in wait for life even before we are born—for this same kind of natural waste goes on before birth in all animals, including ourselves.

A later-stage photograph in Dr. Hartman's collection is even more striking,

though taken at a considerably lower magnification. It shows, as he says, "the eggs in the basket they came in;" for it is a picture of the uterus of one of the animals opened, showing the vesicles, increased in size, each bearing the recognizable beginnings of body structures.

To be sure, these objects, shown in higher magnification in a third photograph, do not look at all like even the youngest opossums. Garden slugs are about the only familiar animal form they at all resemble, and that resemblance is only of the faintest and most superficial sort. Yet opossums they will become, for they bear within themselves the still mysterious substances or forces that constitute biological predestination toward 'possumhood.

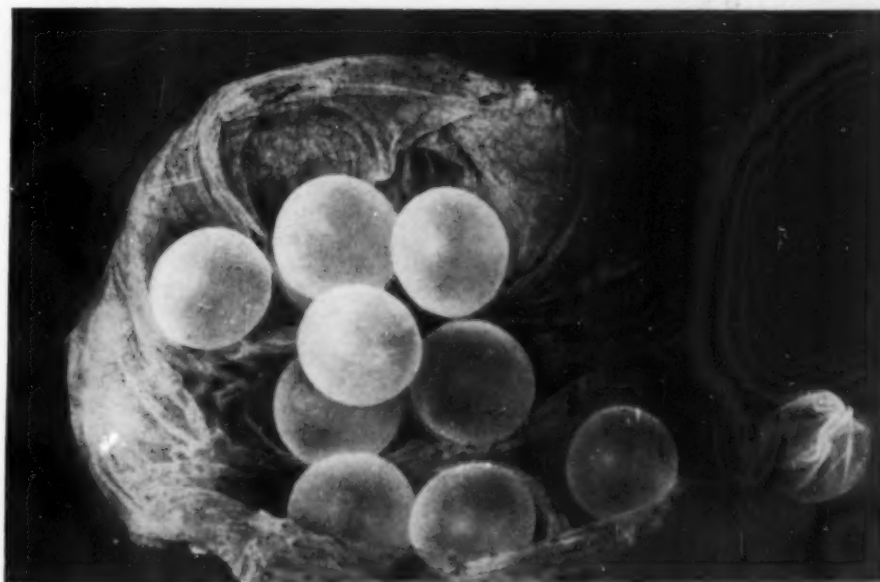
Science News Letter, July 10, 1937

ASTRONOMY

Major Disturbance Due On Planet Jupiter

A GREAT disturbance on the planet Jupiter to occur during the next few months was predicted in a communication to the American Association for the Advancement of Science from Dr. E. C. Slipher of Lowell Observatory, Flagstaff, Ariz. It will take the form of a series of intense dark spots in the giant planet's equator. A small faint marking gives warning of the approaching spots, judging from a similar event in 1920.

Radio communication over long dis-



"IN THE BASKET THEY CAME IN"

Female opossum's uterus, cut open to show a number of the eggs, each with an embryo in very early developmental stage.

tances by short waves will have frequent interruptions as the sun becomes more spotted in coming months, Dr. A. G. McNish of the Carnegie Institution of Washington predicted to the American Association for the Advancement of Science. Magnetic storms here on earth

caused by variations in the ultra-violet light from the sun are the cause.

But when the sun begins to recover from its spots a few years hence very shortwave signals which now span the Atlantic will become useless for long distance transmission.

Science News Letter, July 10, 1937

GENERAL SCIENCE

Odd-Sized Subatomic Unit Suggests Universe Not Uniform

Airplanes Make Static That Deadens Their Radio; Deafness A Drawback to Writing, A.A.A.S. Learns

THAT the universe may not be uniform with regard to the fundamental building blocks of matter is hinted in the report on a recently detected particle in cosmic rays, presented by Dr. J. C. Street of Harvard University to the American Association for the Advancement of Science meeting in Denver. From beyond the Milky Way are imported as part of the cosmic rays constantly penetrating particles not found on earth. They are responsible for the showers in the cosmic rays. The new particle is five to fifty times heavier than the familiar unit of electricity, called the electron, but it carries the same electrical charge.

Magnetic storms here on earth cause a variation in the intensity of cosmic rays recorded on delicate instruments, Dr. R. D. Bennett of the Massachusetts Institute of Technology reported.

A year-round cosmic ray recorder will be installed in America's highest scientific laboratory on the 14,256-foot peak of Mt. Evans near Denver, Dr. Joyce C. Stearns of the University of Denver announced. The high altitude laboratory, built to withstand winds of 150 miles per hour, begins its second summer this season. The question as to whether cosmic rays can affect the course of evolution will also be studied by exposing fruit flies on the peak this summer.

Only Ideal Conditions

The next time you complain about the weather, saying, "It's too hot—or too cold—or too dry—or too wet," say instead, "I'm lucky to be alive." Realize that so far as scientists now can say conditions like those existing on the earth are about the only kind in which life can exist. And this is not particularly because of lack of knowledge about the

laws of science which operate elsewhere in the universe.

Such was, in effect, the message of the distinguished British chemist, Prof. Nevil Vincent Sidgwick of Oxford University, in the Maiben Lecture before the American Association for the Advancement of Science.

Prof. Sidgwick showed that out of the possible billion-degree range of temperature which can exist from the coldest depths of interstellar space to the centers of flaming stars, chemical molecules—and therefore theoretically life itself—can exist only between 6,000 degrees absolute, temperatures like those of the surface of the sun, and the temperature of liquid air at 100 degrees above absolute zero.

Actually 6,000 degree temperatures are twice as hot as electric arcs, made by man, and far above those temperatures that can support life. Greatest temperature restriction of life, said Prof. Sidgwick, is the necessity that organisms have to have some liquid to act as a lubricant. Water is this lubricant, so life cannot exist where the temperature is consistently below water's freezing point or hotter than water's boiling point, a range of 100 degrees Centigrade.

Other restrictions on life, declared Prof. Sidgwick, are that it must occur on the surfaces of planets if radiant energy is to be utilized. Also it will have to occur on a planet of just the right size. If the planet is too small, like the moon, all its atmosphere will fly away into space; if the planet is too heavy it keeps too much of its atmosphere. The thick clouds prevent the planet from getting the radiant energy from its parent star and it is too cold to permit life.

Of the planets of the solar system Prof. Sidgwick said, "The moon is much too

small for life to be possible; Mercury is probably too small and too hot; Jupiter and the outer planets too cold. The only places in the solar system where life is possible seem to be the earth and our two neighbors, Mars and Venus."

Planes Make Static

When an airplane flies into a cloud the pilot begins to have trouble with static in his radio reception. This has always been blamed on electrically charged water drops or snow crystals in the cloud; but experiments reported by H. M. Huckle, experimental engineer of United Air Lines have shown the cause of the trouble to lie in charges already gathered on the surface of the plane and discharging through the trailing edge.

These experiments, performed on a new \$75,000 "flying laboratory," have already led to the development of a system for discharging the static from planes flying through charged clouds, which is expected to improve plane-ground communication very materially.

Plants Need Zinc

Sickly folk have long been told they need iron; now it is the turn of sickly plants to have zinc prescribed for them. P. L. Hibbard of the University of California told of his investigations of soil zinc in connection with the plant diseases variously known as rosette, little-leaf, and dieback.

There is very little zinc in ordinary soils, he reported; between one and ten parts per million, as determined by extraction with weak acetic acid. The midpoint of this range seems to be what is needed for plant health. At less than five parts of zinc per million of soil, it may become necessary to add zinc to the fertilizer formula.

No Drawback

Objections to separating bright pupils from dull ones in special classes, on the ground that the dull ones would acquire inferiority complexes and the bright ones become "swell-headed," were found to be ill-founded in studies reported by Dr. Lillian G. Portenier of the University of Wyoming. The bright pupils who were already properly adjusted in their social attitudes showed no change for the worse, she found, while the dull ones showed marked improvement. The same groups were followed up for twelve years, and the good effects of separating them at the outset were apparently persistent throughout.

Science News Letter, July 10, 1937

PSYCHOLOGY

Apes Taught to Use Gestures To Enlist Aid in Joint Task

Achievement Never Before Possible to Infrahuman Creatures Is Credited to Yale's Chimpanzees

WHAT means of communication do chimpanzees have?

That is the question scientists are asking themselves as a result of experiments just reported by Dr. Meredith P. Crawford of Yale University's Laboratories of Primate Biology.

Neither circus man nor scientist has ever been able to teach an ape to speak despite the fact that the chimpanzee, nearest kin to man, appears to be endowed with all the necessary vocal apparatus and perhaps with sufficient intelligence to make speech a possibility for him. What he may lack is surprisingly enough, the ability to ape sounds. With the ape it is a matter of "monkey see, monkey do." What he hears, he does not try to imitate.

If chimpanzees ever learn a language, it most probably will be a language of gestures such as that used by deaf-mutes among the human family, so the students of these animals have predicted.

Now Dr. Crawford reports what may be a beginning in this direction!

Compelling gestures that induce another chimpanzee to leave her play and do her share in a common task have actually been learned and used by chimpanzees under Dr. Crawford's instruction. This may not be language as the human knows it, but it certainly serves as a means of communication between apes, understood and acted upon by them.

Not Instinctive

The story of how Dr. Crawford reached this goal is a dramatic one.

Cooperation in solving problems is not a natural instinct among animals. The chimpanzees required long and patient instruction before they learned to work shoulder to shoulder to gain a common reward of coveted fruit. This step was necessary before they could be taught to call upon each other to share in the joint labor.

Five young animals were used, four of them females. All but Alpha, a timid creature of slightly below average intelligence, learned to work together in co-

operation. But only two, Bula and Bimba, who are the most intelligent, succeeded in learning to use the gestures to secure aid from their cagemates.

Pulling a weighted box on a rope to secure its reward of fruit was not a difficult task for a single ape at Yale where chimpanzees have already learned to earn money and use it to buy valuables from slot machines, the "chimpanzees."

But chimpanzees are individualists of the most rugged sort. When two animals were placed so that either or both could reach a single rope, they might both pull on it, but not at the same time.

One animal would pull on his rope while the other watched. Then the other would try it for a while. Sometimes they would work alternately on the same rope, passing it back and forth between them.

New Tactics

It was obvious to Dr. Crawford that they would never get anywhere that way, so he tried new tactics. Going back to the lighter weight boxes, he used two instead of one and trained the animals so that as soon as the boxes were baited, the chimps would begin to pull. In this way he "fooled" them into simultaneous activity. Then one heavy box was substituted.

Perhaps you picture Bula and Ross at this stage as pulling on their respective ropes, gaining the joint reward, and solving their problem. No, it wasn't that easy. Again the chimps would alternately pull and watch. Sometimes by accident their labors overlapped and they secured the reward. But each animal worked without paying attention to the other, without real coordination. Eventually the system broke down completely and matters were back exactly where they started.

Again Dr. Crawford revised his tactics. Now he took a part of the job and did a share of the labor. He would pull on the rope and call to the chimps, "Pull, Bula! Pull, Ross!"

This scheme was (Turn to page 30)



LANGUAGE?

A—Bula beckons Bimba to start work. B—Bula turns Kambi's head toward the grille. C—Bula's hand is on Kambi's, pushing it toward a rope. D—Bimba urges Bula forward with her hand on Bula's neck. E—Bula and Bimba finally pull together. F—Bula and Kambi have reward. These pictures, enlarged from 16 mm. film, were made by Dr. Meredith Crawford.

MEDICINE

Gas Gangrene Yields To New Chemical Remedy

GAS gangrene, most serious danger in war wounds and frequently fatal condition whenever it develops, can be successfully treated with the new chemical remedy sulfanilamide, or Prontosil as it is also called.

Case reports and laboratory studies showing this were reported by Drs. Perrin H. Long and Eleanor A. Bliss of the Johns Hopkins Hospital and University at the meeting of the Canadian Medical Association in Ottawa. The laboratory work was done by Drs. Long and Bliss and the patients were treated by Dr. Harold Bohlman, also of the Johns Hopkins Hospital.

Drs. Long and Bliss were the first to use the new chemical remedy in this country in cases of deadly hemolytic streptococcus infection. They and other scientists have found that sulfanilamide is highly successful in treating infections of these streptococci and also infections of pneumococci, meningococci and gonococci. The particular diseases for which the chemical has been used include scarlet fever, erysipelas, childbed fever, meningitis, Type III pneumonia and gonorrhea.

Gas gangrene is due to infection of wounds with still another disease germ, which has many scientific names but is generally referred to as the Welch bacillus. It occurs particularly in cases involving severe bruises of the deep tissues about the wound, especially if cloth or dirt has been carried into the wound. The disease gets its name gas gangrene from the fact the germ causes gas bubbles to form as it invades the tissues. Treatment of the condition has heretofore not been very successful and it often has been necessary to amputate an arm or leg to save the patient's life.

Science News Letter, July 10, 1937

HYGIENE

Keeping Clean Important Even When Camping Out

THE camping season, initiated by the huge Boy Scout Jamboree in Washington, D. C., is on. Private camps for children and adults, and the camps conducted by organizations such as the Boy Scouts, Girl Scouts, and the Y. M. C. A. are running, and family and other small parties are planning their own camping trips.

The healthful results of such outings

may, however, be entirely spoiled by failing to give enough attention to possible hazards, among them poor sanitation. To most small boys and many grown-up boys, half the fun of camping is getting away from such formalities as clean collars and washing hands before dinner, while the feminine campers may look forward to freedom from dish-washing and laundering.

Disease germs, however, take no vacations and rules of cleanliness that are made to check the spread of germs cannot be safely abandoned with conventional attire and fine table linen.

In supervised camps purity of water and food, and cleanliness of person, clothing and utensils are emphasized quite as much as swimming lessons and nature study. Cleanliness is one of the important features of camp craft, a fact which the small, unorganized camping party may forget.

Sunshine and fresh air are not enough to check the spread of disease germs. Soap and water are also needed. Laundry and dishwashing can be cut to a minimum by using paper plates, towels and napkins, but knives and forks must still be washed thoroughly after each use. So must hands, particularly those that prepare and handle the food.

Hardy campers may think it sissified to object to ants in the sugar, but food must be kept clean and protected from dirt, flies and other insects, if it is to be insured against disease germs.

Science News Letter, July 10, 1937

MEDICINE

Hormone Injection Gives Quick Test for Pregnancy

A NEW, quick and inexpensive test to determine whether a woman is going to become a mother was reported by Drs. John Huberman, Howard H. Israeloff and Benjamin Hymowitz of Newark, N. J. The test is made by injecting under the skin of the forearm one of the hormones present in the body of an expectant mother. If the skin becomes red and inflamed, the test is negative and the woman is not about to become a mother. If there is no reaction, the test is considered positive evidence that the woman is bearing a child.

The test was originally devised by Drs. G. C. Gilfillen and W. K. Gregg of Dayton, Ohio. The Newark physicians found it 90 per cent. accurate in tests of 200 expectant mothers and 95 per cent. accurate in 150 women known not to be expecting children.

Science News Letter, July 10, 1937

IN SCIENCE

ASTRONOMY

Pittsburgh to Have \$750,000 Planetarium

A PLANETARIUM in which the parade of sun, moon, and stars can be demonstrated for the public, will be built for Pittsburgh. That city will be the fifth in the United States to have one of these "glorified magic lanterns" which project images of the heavenly bodies on the inside of a white dome, and, by means of ingenious motors, show the apparent daily motion of the bodies across the heavens.

In recent years, planetariums have been built in Chicago, Philadelphia, New York, and Hollywood. The Pittsburgh planetarium is a gift of the Buhl Foundation, and will cost with equipment \$750,000. It will be made by the famous Carl Zeiss optical works in Germany, originators of the planetarium.

Science News Letter, July 10, 1937

SEISMOLOGY

Atlantic and Pacific Have Quakes On Same Day

EARTHQUAKES under two oceans was the record hung up on Thursday, June 24, the U. S. Coast and Geodetic Survey's seismologists informed Science Service, after studying coded telegraphic reports from a number of American observatories.

The Atlantic shock occurred at one-tenth of a minute after 3:00 p. m., eastern standard time; its epicenter was located approximately in 36 degrees north latitude, 36 degrees west longitude, about 500 miles southwest of the Azores.

The Pacific quake started at 8:09.3 a. m., eastern standard time, and had its epicenter somewhere near nine degrees north latitude, 90 degrees west longitude. This is a point about 700 miles off the north coast of Peru.

Observatories reporting to Science Service were those of the Jesuit Seismological Association at St. Louis University, Georgetown University, Fordham University, Canisius College, and Weston College, and those of the U. S. Coast and Geodetic Survey at San Juan, P. R., and Tucson, Ariz.

Science News Letter, July 10, 1937

THE FIELDS

ANATOMY

Famous Brains Reveal "Signs of Inferiority"

EXAMINING hundreds of human brains, famous and otherwise, a Soviet anatomist, Gregoire Levin of the Bekhterev Institute for Brain Research in Leningrad, has discovered that supposed "signs of inferiority" exist in brains of prominent civilized personalities just as frequently as in brains of benighted savages.

His verdict, which deals a blow to the hope of science to find visible reasons for inferiority in human brains, is reported in the United States in the *Journal of Physical Anthropology*.

M. Levin checked up on six of the supposed signs of inferiority, which are often pointed out in brains of primitive peoples, or in brains of mental defectives. He concludes that no special racial characters have yet been detected in the structure of the brain.

"The whole subject," he declares, "demands a thorough expert and adequate determination in the future."

Science News Letter, July 10, 1937

ARCHAEOLOGY

Hunting Traps Are Clues To Man's Prehistory

INDIANS now living in Labrador make hunting traps like those devised by Europe's cave men when they hunted big game 30,000 years ago.

This may seem merely an "odd fact." But it is a valuable scientific clue for prehistorians who are trying to figure out where on earth our prehistoric ancestors were at various stages of time, and how man migrated to America and other lands.

Similarity between Indian gravity traps and traps pictured by Stone Age artists on European cave walls has been detected by Prof. Julius E. Lipps, one of the noted scholars who fled Nazi Germany. Formerly professor at the University of Cologne, Prof. Lipps has come to America.

In Stone Age pictures, Prof. Lipps points out bison and mammoth with crude lines in front of them. Prehistor-

ians used to think these lines represented ornaments or huts.

He interprets the low bars and slanting lines as gravity traps made of logs and other heavy objects. He points out a mammoth's foot drawn below ground level, as if in a pit.

Stone Age hunters apparently used such pictures as sympathetic magic. By conjuring over the picture, they hoped to make the scene come true when they set a real trap.

Finding Montagnais-Naskapi Indians using this 30,000-year-old trapping system shows how widely it was diffused. Prof. Lipps thinks it was invented somewhere in Asia. From there, in the later Old Stone Age, it became known in Europe. From Spain it reached Africa.

In the opposite direction, more recently, it apparently spread to Siberia's north-east tip, thence to Alaska and east to Labrador.

Prof. Lipps says it would be worth while to trace this trap all over the globe, because it would provide much information about the migration of an invention in the prehistoric world.

Science News Letter, July 10, 1937

CHEMISTRY

Smoke Cigarettes Tandem To Avoid Nicotine

FOR people who still worry about the amount of nicotine present in the smoke of the cigarettes they use, scientists suggest that they use two at once. One to smoke and the other to filter the smoke from the first.

Smoking cigarettes in tandem with special holders removes 54 per cent. of the nicotine when a small puff is drawn, states a report to the American Chemical Society.

The report does not come from cigarette companies, as one might suspect at first, but from scientists R. B. Derr, A. H. Riesmeyer and R. B. Unangst of the Research Laboratory of the Aluminum Company of America.

The cigarette holders used in the study need not be excessively long, state the scientists. One 3.75 inches long and three-eighths of an inch in diameter is large enough to hold an ordinary cigarette acting as a filter.

Extra mildness is imparted to the smoke by the cigarette filter, it was found. Yet the characteristic taste blends of the tobacco remain distinguishable. The test was also made with pipe where the cigarette filtering system worked even better.

Science News Letter, July 10, 1937

PHYSICS

Thinnest Protein Films Measured on Tiny Drum

ATINY drum whirling in egg albumen is one of the new techniques helping scientists to measure the thickness of protein films, such as constitute the walls of the cells of living matter.

Films only 86 billionths of a centimeter thick can be measured, the Fourteenth Colloid Symposium of the American Chemical Society meeting at the University of Minnesota learned from the report of Dr. Henry B. Bull of the Northwestern University Medical School.

The drum, of exactly known dimensions, builds up a film at a known rate. The volume of protein film is calculated and divided by the total area of the drum to obtain the thickness of the film.

Science News Letter, July 10, 1937

ENGINEERING

Tobacco Smells Increase For Hours After Smoking

ENGINEERS may discuss ventilating and air conditioning and use their layman-baffling "cfm's" to describe the flow of air, but what most people want to know is what to do about odors when they think of ventilating.

At the meeting of the American Society of Heating and Ventilating Engineers, two scientists from Harvard's School of Public Health disclosed their studies about odor removal from rooms and auditoriums.

Prof. C. P. Yaglou and W. N. Witte-ridge showed that there is a characteristic human smell which can be detected in a room after the occupants have left it. This human odor is apparently highly complex, unstable and rapidly breaks down, but there is a certain minimum amount of the odor left in a room which will last for days until it is thoroughly ventilated. The findings show that where numbers of people gather large rooms should be used, for great size acts as a sort of reservoir of odor which allows the initial decrease in intensity of odor to occur harmlessly.

Sharply in contrast, they reported, is the characteristic of tobacco smoke which becomes more noxious with time up to periods of three hours after active smoking has ceased. The rise in odor intensity of tobacco smoke is more offensive than the odor of fresh smoke.

It would thus appear, state the Harvard scientists, that smoking rooms should be small with very rapid ventilation for the best results.

Science News Letter, July 10, 1937

GEOGRAPHY

Arctic Conquest

"Seward's Ice Box" in Alaska Turned Out a Real Bargain; Now Russia Exploits Her Own Frozen North

By DR. FRANK THONE

WHEN a Russian airplane slid to a stop on an ice floe at the North Pole, one day this spring, all of Soviet Russia celebrated jubilantly.

Not because it was a sensational stunt. Other men have visited the pole. Peary got there, something like 30 years ago. Byrd, Amundsen, Nobile and others have flown over it. And the Russian government is not out for stunts, anyway.

Its flight to the pole—where, on a drifting floe, four men planned to stay a year, polar hazards permitting—was simply one more step in an elaborate scheme for conquering the frozen Arctic and putting it to work.

That was why Russia wanted to establish a camp at the pole. Scientific observations over a year's time would tell much about the "weather's kitchen," where the northland's storms are made. They would also show whether a trans-polar air service would be feasible, and would help make possible navigation of the sea along the Arctic coast of Siberia.

The expedition was under the direction of Prof. Otto J. Schmidt. The four men who attempted to establish a permanent camp on the floe were Ivan Paparin, once manager of a polar station in Franz Josef Land; Ernest Krenkel, radio operator, who went to the Antarctic with Byrd in 1930; Pytor Shirsoff, hydrobiologist, and Eugene Federoff, magnetologist.

Accept Risks

Other airplanes brought equipment, supplies and the like to the men on the ice. Their venture was admittedly risky, due to the way polar ice floes often break up without warning—but they accepted the risks as a part of Russia's long-range plan.

When Secretary of State William Henry Seward negotiated the purchase of Alaska from Russia in 1867, scoffers nicknamed the territory "Seward's Ice Box" and substantial, level-headed businessmen groaned aloud over the waste of the taxpayers' money by a crackpot Administration. The verdict of time has proved to be heavily on the side of Seward.

After the sale, Russia still had enough Arctic land in Siberia to make another half-dozen or more Alaskas, with potential resources on a commensurate scale. But the Grand Dukes who were the real rulers of Russia never bothered to find out what was there. They were too busy. They invested in two or three terribly costly wars, and sat tight on the safety-valve of bubbling unrest among the people.

New Regime

Came the Revolution, sending the poor Czar and his ducal masters flying. When the dust cleared away, a brand-new group of rulers, who called themselves People's Commissars, sat in the Kremlin. These men, faced with the responsibility for the welfare of close upon 200 million people, knew that they had to exploit to the limit the resources of the vast territory at their command. Faced also with the hostile skepticism of most of the outside world, they felt that they had to do heroic things as demonstration of their right to govern.

The two drives could in many instances be given a common aim. Con-

quest of desert, marshland, tundra, mountains, to obtain new croplands, new metal mines, new sources of fuel, often demanded the impossible. Good! Young Russians, captained by giants, would do the impossible. We'll *show* these bourgeois doubters! they told each other.

Conquest of the North

Mightiest of these hopeful Soviets to accomplish the impossible, probably, is the huge undertaking of the conquest of Russia's Arctic—the long-neglected dozenfold Alaska of the Old World.

A glance at your map of Asia, or better, at a commercial atlas, will show the opportunities, the possibilities, the problems, the difficulties of this conquest. Russian Asia consists mainly of a great plain sloping northward toward the Arctic from the vast barrier of mountains that cross the continent from southwest to northeast. Its southern part consists of grassland and desert, giving way northwardly to the world's most enormous virgin forests of evergreens, and these in turn to the bleak inhospitable Arctic brush- and grassland known as the Tundra.

Through all this, from south to north, flow half-a-dozen mighty rivers: Ob, Yenisei, Khatanga, Lena, Indirgka, and a number of others. These would be



FRONTIER

There is something suggestive of a raw-built city in our own Alaska in this view of Khibinogorsk, on the Kola peninsula.



AGRICULTURE

This girl, who looks as though she might be a daughter of the vikings, is a technical worker in a plant breeding station in the Arctic. The thing she is holding out in her left hand is just a radish.

ideal for floating logs down to the sea, for cheap transportation to a world now grown very hungry for lumber and paper-pulp. That is, they would be ideal, if that sea were any but the Arctic Ocean, traditionally the one wide water in the whole world that is forbidden to ships.

"Northeast Passage"

Ever since Columbus first crossed the Atlantic and Magellan showed the way around the world, there have been dreams of opening the "northeast passage" along the north shores of Asia, down through Bering Sea and out southward into the Pacific to the silks of Cathay and the spices of the Indies. Hardy explorers have made the attempt from the days of English King Henry VIII until our own time. One or two managed to get through, but until the last decade the Northeast Passage has been regarded as a stunt for explorers and geographers and not as a route for cargo ships.

But the new effort by the Russians is distinctly aimed at getting paying numbers of commercial ships in and out again during the open season, to bring colonists and supplies and to take out lumber, mineral ores, and other products of the country. The ambitious foundations thus far laid were described a short time ago by an impartial observer, H. P. Smolka, a Viennese geographer, before

a meeting of the Royal Geographical Society in London.

Foreigners Not Invited

Mr. Smolka, who is not a Communist, stated that he had to get special permission before he could go to this northern outpost of the U.S.S.R., which is usually closed against foreigners. He went in by plane, travelled over part of the region partly by plane and partly on boats, and finally came out on a steamer.

For shipping ventures into the Northeast Passage, however, the starting point is the port of Murmansk, on the coast near the Finnish border. Murmansk, before the War only a fishing village and minor port, has now grown to a city of 100,000 population, quite overshadowing the prewar port of Archangel on the White Sea. Paradoxically, Murmansk on the Arctic is Russia's only port on open water that is ice-free the year round. A branch of the Gulf Stream accounts for that.

Even newer than Murmansk are the port towns that have been founded on the wide mouths of the great north-flowing rivers of Asia, the Ob, the Yenisei, and the Lena. Here the lumber steamers call for cargo, and here are timber-handling wharves and sawmills. The town names are Novi Port on the Ob (that would be Newport, in English), Port Igarka on the Yenisei, and Port Tiski on the Lena.

Of these three settlements, Port Igarka is the largest. Its population, as reported by Mr. Smolka, is about 14,000—including a couple of thousand children. About 4,000 of the population were exiled Kulaks—well-to-do peasants who resisted taxes and the Soviet farm collectivization program.

Reports Status


Disclaiming knowledge of actual conditions some years ago, when these Kulaks were alleged by many newspapers to be very badly treated, Mr. Smolka made the following statement regarding their present status:

"Now they are paid normal wages for their work in Igarka, and outwardly can hardly be distinguished from the free workers. They live door to door with them. . . . Their children are rapidly assimilated to the new society. They go to school with those of the free workers, and when they reach the age of eighteen are given all political rights and allowed to join even the Communist organizations, which is a privilege in Russia. The Kulaks themselves are restored to their civil rights and given passports if, after a number of years, the authorities decide that they have worked well, have shown interest in factory production, and on the whole have proved themselves to be 'dekulakized.'"

Timber of course is not the only source of wealth that is exported from these new Arctic ports, though it is as yet the principal one. In some places metal ores have been discovered and work has begun on these mines, particularly for nickel, because of its importance in the huge Soviet armament program. Coal near the surface is being dug, but principally for refuelling the

PSYCHOLOGY OF SEX
by HAVELOCK ELLIS


ONE VOLUME
• UNABRIDGED



PSYCHOLOGY OF SEX

CARL VAN DOREN
Says:
"The best one-volume treatment of sex in the English language."

"...the best of all available books on this subject."
—HYGEIA (Published by the American Medical Association)



AUTHORIZED EDITION

—PARTIAL CONTENTS—

The Art of Love
Substitutes for Sex
Sex in Marriage
Sexual Adjustments

Sexual Variations and Abnormalities
Sex Life of Unmarried Adults
Age and the Sexual Impulse

Price \$3.00 (Postage 15c Extra) 389 Pages
5-DAY MONEY-BACK GUARANTEE
Emerson Books, Inc., Dept. 89-A, 251 W. 19th St. N. Y. C.



FAR NORTH

Modernistic architecture above the Arctic Circle. Murmansk, Russia's Arctic Ocean seaport, now has a population of 100,000, and is outfitting headquarters for expeditions heading north and east.

ships that come for cargo and the ice-breakers that open paths for them.

The whole job of navigating on the Siberian north coast is a difficult one, for ice is always a menace to navigation. To scout best ways for cargo ships to get through, airplanes based on shore and island stations take to the air when ships approach, and radio down directions. There are some threescore of these Arctic aviation and radio outposts now on duty. As a valuable byproduct of their activities as navigational aids, they also assemble a great deal of useful data on weather, ocean currents, ice conditions, animal and plant life, and other valuable scientific information. The Academy of Sciences of the U.S.S.R. has found it necessary to establish several new science journals for the publication of these researches.

There is even the prospect of tourist

trade in the Arctic. Tass, official news agency of the U.S.S.R., has announced a tour starting at Murmansk, taking in points of interest around Novaya Zemlya, and returning by way of Archangel. The first steamer is billed to start about the end of July. This trip will of course not take the tourists very far into the Northeast Passage, but it will at least give them an idea what the Russian North is like.

A further possible usefulness of the Passage is suggested by Mr. Smolka. In the event of a European war bottling up Russia within her own boundaries, it might be possible for steamers to follow the Arctic coast to Bering Strait, thence southwardly along coasts covered by the American and British flags, to obtain supplies in the United States and Canada. On return, their cargoes would be carried up one of the great Asiatic rivers, possibly the Ob and its branches to Novosibirsk or Omsk on the Siberian Railroad. That would be just about a shellproof route for at least the most vital materials, such as certain drugs and hospital supplies, and possibly the rarer metals used in alloying steel.

Arctic Gardens

One aspect of the Soviet venture in the Arctic that never fails to make the stranger's eyes pop out is the cultivation of vegetables in the Far North. To be sure, we have been doing that in Alaska ourselves, but for the most part not quite so close to the Pole. Successful outdoor crops thus far have been principally salad vegetables such as radishes and cabbage, and (with somewhat less éclat) potatoes. And the workers' wives have even raised bright flowers around their houses. Moreover, the presence of fair numbers of horses and cows has necessitated the raising of hay.

One of the factors most likely to be overlooked by anybody unused to high latitudes is the very long day of the Arctic and sub-Arctic regions. The vegetables and hay get 24 hours of sunlight every day during the greater part of their growing season. Naturally they grow fast and get big.

Sometimes special breeds are necessary, for this very reason. When the big white radishes that Russians like so well were attempted in the North, they all ran to leaves and produced small, stringy, inedible roots. But geneticists worked out a new strain that would take the long Arctic daylight and turn it into enormous radishes as big around as a man's leg.

Even in the island outposts vegetables are raised, in underground chambers

RADIO

July 13, 4:15 p. m., E.S.T.
FOUR RULES OF THE ROAD—Dr. H. C. Dickinson of the National Bureau of Standards.

July 20, 4:15 p. m., E.S.T.
SCIENTISTS OF THE FUTURE—Dr. Gerald Wendt, Director of the American Institute of the City of New York.

In the Science Service series of radio discussions over the Columbia Broadcasting System.

insulated with wood and fur and lighted only with big incandescent lamps that get their power from huge windmills. This is admittedly a costly way to get one's "greens" but one must have them somehow, and this method appears to be cheaper than flying them in by airplane.

At any rate, such heroic methods used to get nothing more vital than a bowl of salad, one must admit the young Muscovites up there in the Arctic are cheerfully ready to tackle tougher jobs with the requisite vim.

This article was edited from manuscript prepared by Science Service for use in illustrated newspaper magazines. Copyright, 1937, by *Every-Week Magazine* and *Science Service*.

Science News Letter, July 10, 1937

PLANT PHYSIOLOGY

Cane Leaves Form Sugar Even When Cut From Plant

SUGAR cane leaves can form cane sugar when they are detached from the stalk and kept in the dark, supplied with the two simpler sugars, glucose and fructose, or with either one of them alone.

Experiments developing these points, performed by Dr. Constance E. Hartt, research plant physiologist for the Hawaiian Sugar Planters' Association, give further support to the theory that conversion of simple into complex sugars can take place in leaves.

Science News Letter, July 10, 1937

A new process for preserving newspaper is intended for use in treating valuable clippings and pages.

Salicylic acid, from which aspirin is derived, was discovered a century ago, but not until 1874 could it be made at moderate cost for general use.

A mysterious old sunken ship in Hamble River, England, is now believed to be the *Grace Dieu* of Henry the Fifth's navy, built in 1418 and famous then as the biggest vessel afloat.

SEASICKNESS

Why Bring That Up?

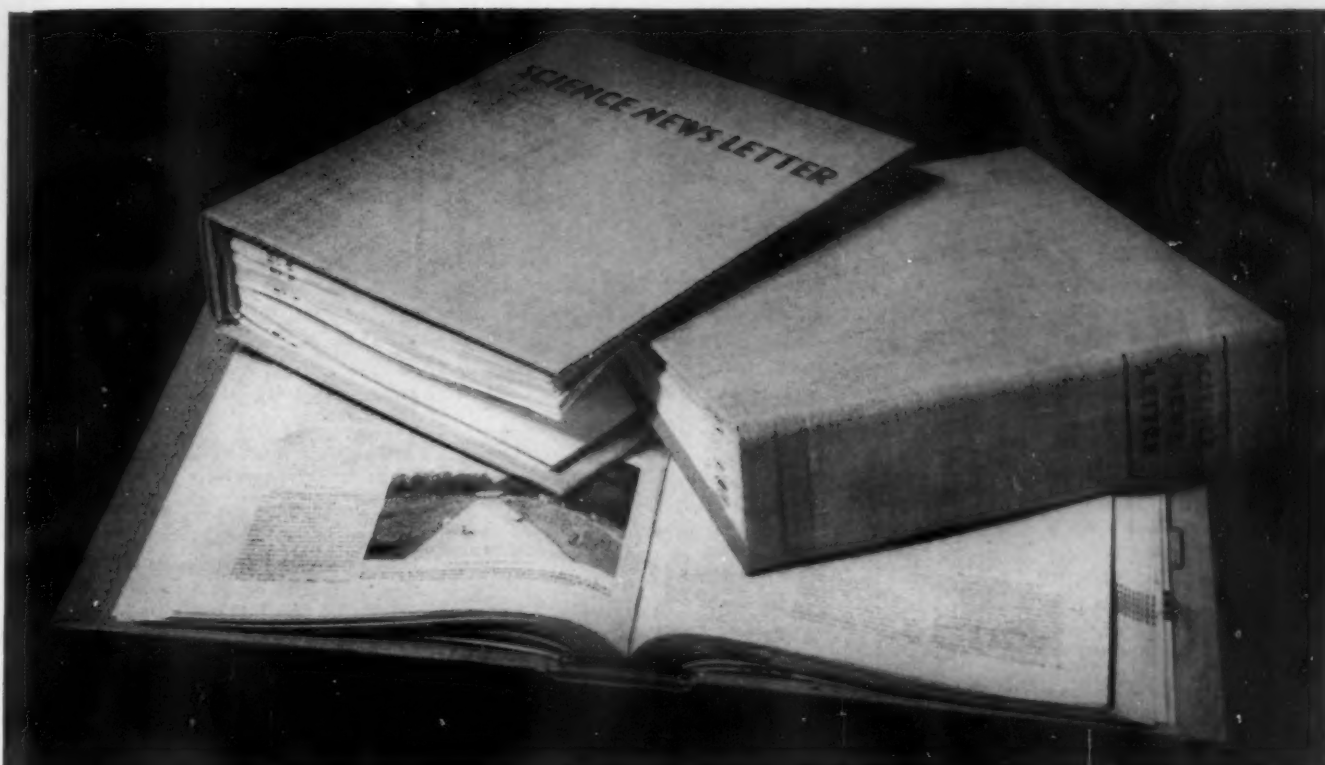
By Dr. Joseph Franklin Montague

What to do about Seasickness

\$2 142 Pages • Helpful • Humorous
Illustrated • and AUTHORITY

Home Health Library, Inc.
516 Fifth Avenue, New York City

SEASICKNESS



Safe . . . Secure . . . Sound . . .

Here is the perfect binder for SCIENCE NEWS LETTER . . . a binder that will keep your favorite magazine of scientific record neat, complete and readable through long, hard use. No more lost copies, no more dog-eared and torn copies, no more copies out of place.

We believe this to be the best binder obtainable at such low cost. It looks like a book and it is a book in every respect save that you snap new issues into the cover with a little unbreakable hooked wire. You may remove them instantly and reinsert them easily whenever you desire. The cover is of handsome basket-weave buff buckram with SCIENCE NEWS LETTER stamped in gold on the front and spine. It holds 26 copies, opens freely and allows the pages to lie flat as shown in the photograph. It is durable and will last for years.

The cost, including postage, is \$1.25. We are so sure that you will like the binder that we offer to return your money if you are not satisfied.

Features:

Light weight

Durable

Flat when opened

Easy to insert or remove each copy—takes only a moment!

SCIENCE NEWS LETTER

2101 Constitution Avenue
Washington, D. C.

Enclosed is \$1.25 for one of the new SCIENCE NEWS LETTER binders. It is understood, of course, that you will refund my money if the binder proves unsatisfactory.

Name _____

Street address _____

City and State _____

From Page 23

effective; the chimps learned to pull together on the common task, and man learned something also from the chimpanzees. To teach cooperation, it seems, it is first necessary to take on your own share of the pulling. It may be that nations, as well as individuals, could profit from this lesson learned in the chimpanzee school.

Gradually, Dr. Crawford could do less and less actual work on the box, calling to the animals and timing his "Pull!" so that it would come just before the animals would start to heave.

Later, he could leave all the work to the animals, but he must still bend over the box and touch it as well as call them to the task, for they needed a visual cue as well as the auditory one.

Finally, Ross and Bula would respond to just the call. They could work together if they had the impetus of the "foreman's" voice which served perhaps much the same purpose as did the old chanteys that set pace for seamen as they pulled on the ropes of some old sailing ship.

Signal From Ross

Bula was the first of the animals to reach the next stage in learning cooperation. When she was working with Ross, she noticed a squeak as Ross tightened his rope for a heave and the rope rubbed against the box. Thereafter, that squeak was as good as a command for Bula. When she heard it she pulled. Later she learned to watch other signs in Ross' behavior that were signals that the task was on. Then Dr. Crawford's call could be omitted. Real cooperation had been attained.

Bula it was, too, who first learned what had never been expected of an animal lower in the evolutionary family

line than man. She learned to obtain with gestures work from another animal. Here is the picture of what took place.

The box was baited. But Kambi, Bula's partner, was not at her place at the ropes. Bula was excited. Back to the rear of the cage she ran, approaching Kambi with hands outstretched, palms down, fingers bent, arms beating up and down. Crouching, she would bounce up and down excitedly on flexed legs, whimpering and hooting as she always does when excited. Now Bula would tap Kambi on the shoulder or grasp her elbow and turn her about.

Misinterpreted

Not always did Kambi know what Bula wanted. She soon learned to know that the gestures meant, "Do something for me," but sometimes she would respond by offering to start the two-by-two lock-step marching that is such a favorite diversion of chimpanzee companions. Sometimes she would start grooming her. She would even present to her some treasure that she might have in her possession.

But Bula would persist until at last Kambi was at her post pulling her share of the burden.

Amusement came with the later pairing of the trained ape Bula with Bimba. It was comparatively easy to teach Bimba to cooperate with the already willing Bula, but after Bimba had also learned the way to pull with another, Bula lost interest in the job.

Then it was that Bimba turned the tables on Bula. She was the one to say in ape gestures, "Come on now, get busy!"

Her technique was very different from Bula's. She did not get excited over it, she did not cry out, she just went ahead persistently and doggedly gesturing,

taking hold of the back of Bula's neck, drawing or pushing her toward the grill.

Finally Bula grew annoyed at Bimba's persistent urging. She would even whimper sometimes as Bimba drew her to the task, but still she did not refuse to join in the pulling.

Some of the observations made by Dr. Crawford in teaching these simple man-like animals the difficult social task of cooperation for mutual benefit may carry over into the sphere of human relations.

Once an animal has learned to cooperate and solicit the cooperation of one other animal, he can easily cooperate with any others and attempt to secure their aid, Dr. Crawford found.

Friendship makes for easy cooperation. Chimpanzees, like humans, have their preferences in companionship. The animals who had become very fond of each other and were constant pals, delighting in the lock-step marching of chimp chums, could most readily learn to pull together in rhythm for a common reward.

May Compel Compliance

The dominant animal, the natural leader in any pair, can compel compliance with her urging though the other is decidedly reluctant to take hold of the task.

This taking hold and pulling with the mate is sometimes done with no hope of sharing in the fruit reward. Occasionally it happened that one animal's share would fall off the box as it was being drawn in. That animal would go on pulling under the urging of the leader, despite the discouragement.

Cooperation requires intelligence. Only the most talented animals were able to learn the gestures and to take their part as leaders in cooperation.

The results of this experiment are reported for the scientific public in the *Comparative Psychology Monographs*.

Science News Letter, July 10, 1937

This Handy Coupon

IS FOR NEW OR RENEWAL SUBSCRIPTIONS

To Science News Letter, 2101 Constitution Avenue, Washington, D. C.

Please ☐ start ☐ 1 year, \$5
☐ renew my subscription to SCIENCE NEWS LETTER for ☐ 2 years, \$7

Name _____

Street _____

Address _____

City and _____

State _____

Extra postage charges: 50c a year in Canada; 75c a year in foreign countries.

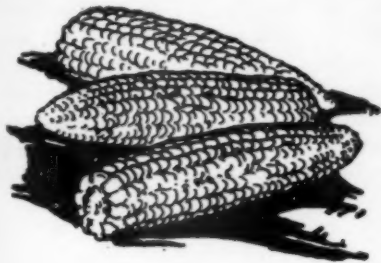
Books

SCIENCE NEWS LETTER will obtain for you any American book or magazine in print. Send check or money order to cover regular retail price (\$5 if price is unknown, change to be remitted) and we will pay postage in the United States. When publications are free, send 10c for handling.

Address Book Department

SCIENCE NEWS LETTER

2101 Constitution Ave. Washington, D. C.



Genii of the Genes

GENII, formidable in aspect but benevolent in purpose, used to appear before startled youths. Proclaiming themselves Slaves of the Lamp or of the Ring, they would procure by magic means all imaginable riches and benefits for their still-bewildered protégés.

To amused Western ears, it has always seemed a bit odd that such portentous powers should have been on tap for the mere touching or turning of such trivial objects as a lamp or a ring. Yet we have among us many mortals like ourselves, but powered beyond the rest of us, who respond to touchstones that at first blush would seem to be of no great intrinsic consequence.

Such men might in all seriousness proclaim themselves Servants of the Sheep, or Genii of Grass. There are hundreds of them, in the U. S. Department of Agriculture at Washington, and in State Experiment Stations all over the country. They are breeders, geneticists, brain-sons of Mendel, each with some one plant or animal which he makes his particular ward. One will have poultry, another pigs, one cotton, another celery.

It may seem odd that grown men should concern themselves so earnestly with what journalists have called (by now a little too often, perhaps) the "love life" of ducks and raspberries; but a peep into the 1937 Yearbook of the U. S. Department of Agriculture, just out, will show justification—often dramatically. Thus one man, by producing one tomato variety resistant to one disease, saved whole Florida communities from ruin. Another, with cabbage, rendered a like service in Wisconsin. And so on.

Secretary Wallace, himself a geneticist, has subtitled the book, "A Survey of Superior Germ Plasm."

Science News Letter, July 10, 1937

Which CAMERA Should You Buy ?

Can you get as good pictures with a \$10 camera as you can with a \$50 one?

Should you buy a miniature camera or a large one? Which is better—the Contax or the Leica?

THE first of two reports on cameras, appearing in the June issue of *Consumers Union Reports*, will help you to answer such questions as these. Non-miniature cameras, including both American and foreign makes, are covered in this report. The second report, which will appear in the July issue, will cover miniature cameras.

As in reports on other products, comparisons of the quality and value of outstanding makes (including Kodak, Agfa, Leica, Contax, and Graflex) will be given, and the Best Buys of each type and in each price range indicated by name. Read these reports before deciding which camera to buy. They will give you the guidance of experts in the selection of a camera. They can save you money and help you get better pictures.

House Dresses—Radio Tubes—Flashlights—Sanitary Napkins

Other reports in the June issue give you the results of tests made on competing brands of house dresses, radio tubes, flashlights, sanitary napkins, shoe whiteners, and canned peaches and canned tomatoes—with ratings, in terms of brand names, as "Best Buys," "Also Acceptable," and "Not Acceptable."

IN THE JULY ISSUE—Ratings of the 1937 Refrigerators A \$3 Investment Which Can Save You \$50 to \$300

Membership in Consumers Union, which brings you twelve issues of *Consumers Union Reports* and a 240-page *Buying Guide*, costs but \$3 a year. Information from many of Consumers Union's 40,000 members indicates that the regular use of these *Reports* and the *Buying Guide* can save the average family sums ranging from \$50 a year to \$300 and over.

Membership can be started with any of the following: SEP.—Shoes, Tires, Whiskies; OCT.—Dentifrices, Gins, Electric Razors; NOV.—Radios, Wines, Children's Shoes; DEC.—Vacuum Cleaners, Fountain Pens, Blankets; JAN.-FEB.—Men's Suits, Cold Remedies, Shaving Creams; MAR.—Autos, Face Powders, Flour; APR.—Shirts, Cold Creams, Gardening; MAY.—Trailers, Washing Machines, and the first of a series of articles on the causes and treatment of constipation.

Mail the Coupon Today!



With your Membership— A 240-PAGE BUYING GUIDE

containing ratings of over a thousand products, by brand name, as "Best Buys," "Also Acceptable," and "Not Acceptable." Get this *Buying Guide* by mailing coupon NOW!

To: CONSUMERS UNION of United States, Inc.
55 Vandam Street, New York, N. Y.

I hereby apply for membership in Consumers Union. I enclose:

\$3 for one year's membership, \$2.50 of which is for a year's subscription to the complete edition of *Consumer's Union Reports*

I agree to keep confidential all material sent to me which is so designated.

Signature _____

Address _____

City & State _____ Occupation _____ L-6

•First Glances at New Books

Physics

THE WORLD OF ATOMS (2d. ed.)—Arthur Haas; Translated by George B. Welch and Horace S. Uhler—*Van Nostrand*, 183 p., \$3. "There is in the process of development a new science of atomic nuclei which perhaps conceals within itself unsuspected possibilities of future industrial exploitation." Including the revolutionary discoveries in atomic physics, this is a brief and satisfactory semi-technical account which will be welcomed by those who have difficulty in keeping up with modern physics.

Science News Letter, July 10, 1937

Chemistry

INTRODUCTION TO QUALITATIVE ANALYSIS—James H. Walton and C. H. Sorum—*George Banta Pub. Co.*, 160 p., \$1.50. A manual for an elementary college course by members of the University of Wisconsin faculty.

Science News Letter, July 10, 1937

Engineering

HIGHWAY RESEARCH BOARD: PROCEEDINGS OF THE SIXTEENTH ANNUAL MEETING—edited by Roy W. Crum—*National Research Council*, 390 p., illus., \$2.25. An annual volume replete with fundamental data that will help engineers to build better and cheaper roads.

Science News Letter, July 10, 1937

Radio

ON THE AIR: THE STORY OF RADIO—John J. Floherty—*Doubleday, Doran*, 99 p., illus., \$2. Popular and pictorial, the past and present of various phases of radio are presented.

Science News Letter, July 10, 1937

Physics

ATOMIC SPECTRA AND THE VECTOR MODEL: VOL. I; SERIES SPECTRA, 237 p., illus., VOL. II; **COMPLEX SPECTRA**, 279 p., illus.—A. C. Candler—*Cambridge (Macmillan)*, \$8.50 set. For technical workers in the field, these volumes present in modern notation the work done by Fowler and Hund and lead to the boundaries on which research is now concentrated.

Science News Letter, July 10, 1937

Philosophy

EVERY MAN A MILLIONAIRE—David Dunham—*Scripta Mathematica*, 95 p., \$1. Among the amazing schemes of David Dunham is the invention of a weather control method. A thousand biplanes are equipped in the upper wings with refrigerating plants and the lower ones with coils for superheated steam.

During a dry spell the airplanes fly in close formation with refrigerators working, thus cooling the air and causing precipitation. When sunshine is desired the steam is used to heat the atmosphere. You may find amusement in this satirical treatise on modern finance.

Science News Letter, July 10, 1937

Psychiatry

THE MENTALLY ILL IN AMERICA: A HISTORY OF THEIR CARE AND TREATMENT FROM COLONIAL TIMES—Albert Deutsch—*Doubleday, Doran*, 530 p., illus., \$3. This history of the treatment of mentally ill persons in America is neither written by a physician nor intended principally for a medical audience. An introduction by the late Dr. William A. White, of St. Elizabeths Hospital, however, serves as a guarantee of its soundness from the viewpoint of the psychiatrist.

Science News Letter, July 10, 1937

Ornithology

CHECK-LIST OF BIRDS OF THE WORLD, VOL. III—James Lee Peters—*Harvard*, 311 p., \$3.50. This new volume in what promises to be a monumental series treats of the pigeons and the parrots.

Science News Letter, July 10, 1937

Orthopedics

TECHNIQUE OF UNDERWATER GYMNASTICS: A STUDY IN PRACTICAL APPLICATION—Charles Leroy Lowman, Susan G. Roen, Ruth Aust and Helen G. Paul—*Amer. Publications*, 276 p., illus., \$5. A technical book for doctors, nurses and physiotherapists.

Science News Letter, July 10, 1937

Hygiene

WOMAN'S PRIME (CHANGE) OF LIFE: MAKING THE MOST OF MATURITY—Isabel Emslie Hutton—*Emerson*, 150 p., \$2. This small book contains much sound advice and information which cannot fail to help the reader.

Science News Letter, July 10, 1937

Zoology

WILDERNESS WANDERERS: ADVENTURES AMONG WILD ANIMALS IN ROCKY MOUNTAIN SOLITUDES—Wendell and Lucie Chapman—*Scribner's*, 318 p., illus., \$3.75. A pair of wanderers setting out to realize the dream of all of us, to do exactly what they pleased and no more of that than they pleased, here tell of their adventures with the winged and four-footed folk in our western highlands, and how "what they pleased" after all turned into another obligation—to the wildlife of North America.

Science News Letter, July 10, 1937

Life Saving

LIFE SAVING AND WATER SAFETY—American Red Cross—*Blakiston*, 267 p., illus., 60c. Just in time for the swimming and water sports season comes this valuable handbook which tells how to take care of yourself in and on the water. Selection of a suitable bathing place, self rescue, rescue of others, resuscitation, and rescue of victims of ice accidents are among the topics covered. The illustrations help to demonstrate the approved methods.

Science News Letter, July 10, 1937

Psychology

EDUCATIONAL PSYCHOLOGY—Thomas R. Garth—*Prentice-Hall*, 319 p., \$2.50. A textbook by the professor of experimental psychology at the University of Denver.

Science News Letter, July 10, 1937

Anthropology

THE AMERINDIANS: FROM ACUERA TO SITTING BULL, FROM DONNACONA TO BIG BEAR—Donald McNicol—*Stokes*, 341 p., \$2.50. This is the story of the experiences of the American Indians from the time of the arrival of the first Europeans until the descendants of the original population took up their present location upon reservations. It thus supplements the story of the Indian which is known from archaeological investigations.

Science News Letter, July 10, 1937

Electrical Engineering

MERCURY ARCS—F. J. Teago and J. F. Gill—*Methuen & Co., London (Chemical Pub. Co. of N. Y.)*, 104 p., \$1.25. A text based on a course of lectures at the University of Liverpool.

Science News Letter, July 10, 1937

Mathematics

GENERAL MATHEMATICS: A ONE YEAR COURSE—Harris Crandall and F. Eugene Seymour—*Heath*, 389 p., \$1.28. For high school use.

Science News Letter, July 10, 1937

Chemistry

OUT OF THE TEST TUBE (new ed. rev. and expanded)—Harry N. Holmes—*Emerson*, 301 p., illus., \$3. A popular presentation of chemistry which should be read by anyone who has to do with industrial or public affairs.

Science News Letter, July 10, 1937

Mathematics

DYNAMICS, PART II—A. S. Ramsey—*Cambridge (Macmillan)*, 344 p., \$4.50. An advanced text for college use, extending the subject in three dimensions.

Science News Letter, July 10, 1937